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THE AMERICAN
JOURNAL OF PHARMACY

*JULY, 1917*

# THE PHARMACOGNOSY OF HELONIAS.

By John Moser

The extensive use of this domestic drug in present-day medicine which led to its inclusion in Part II of the National Formulary, fourth edition, and the confusion between this drug and alertis due to the number of more or less misleading synonyms such as blazing star, star grass, unicorn plant, unicorn root, etc., as well as certain


Fig. 1. Photograph, showing several types of Helonias rhizome: *A*, oblique rhizome with stem base and two stem scars; *B*, upright rhizome showing new growth at top.

errors and omissions in the official description of these drugs make it desirable that an effort be made to clear up the subject. Helonias, known in different localities as devil's bit, blazing star, drooping starwort, unicorn plant, false unicorn root, colic root, etc., is the dried rhizome and roots of *Chamælirium luteum* (Linne) A. Gray, a smooth, perennial, dicœcious herb of the lily family, growing in low grounds from New England to Georgia and westward. Authentic

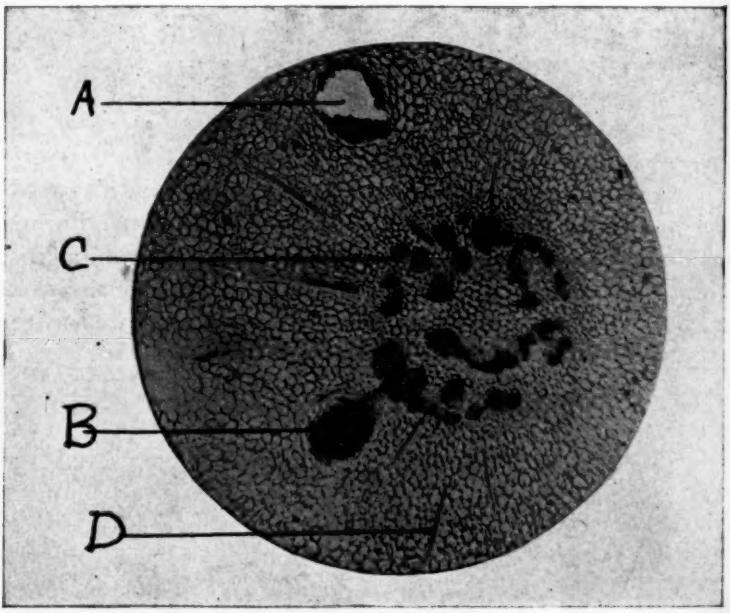


FIG. 2. Cross section of the central portion of a seedling rhizome of Helonias. It will be noted that the endodermal layer is indistinct. *A*, a foramen; *B*, a foramen with section of root in place; *C*, collateral mestome strand; *D*, narrow bands of trachea that extend from the epidermis to the pericycle.

specimens for use in this work were collected by the writer in the vicinity of Baltimore.

A medical history of helonias dates back to its use by the American Indian. It has long been recognized by the American Homeopathic Pharmacopœia, and is now included in the National Formulary. Judging from the amount used in present-day medicine, it ranks among the important domestic drugs.

The chemical constituents of helonias have never been properly investigated, nor has its pharmacognosy been thoroughly gone into, as the National Formulary, fourth edition, fails to mention its most striking characteristic, a feature recognized by Millspaugh in his work "Medicinal Plants," published in 1892.

This feature is aptly described in these words. "When the root (rhizome) is cut across it will be plainly noticeable that the

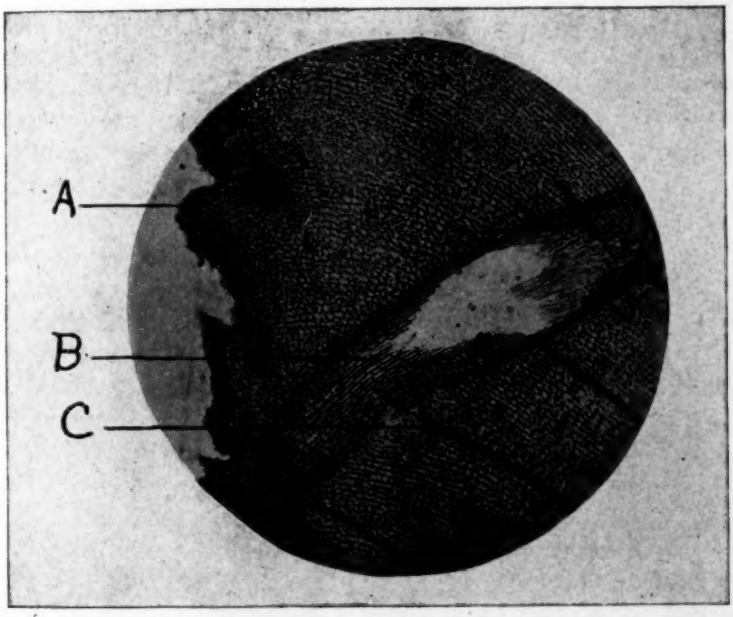


FIG. 3. Radial-longitudinal section of Helonias rhizome. *A*, epidermis, showing annuli; *B*, foramen, showing cells of the tube wall; *C*, bands of narrow trachea.

fibrous rootlets pierce the cortex through ample foramina, in which they are freely movable like threads in the eye on a needle."

The drug consists of an annulate rhizome of upright or oblique growth (Fig. 1), 1 to 5 cm. long, 0.5 to 1 cm. in diameter, bearing at the crown numerous leaf bases or in rhizomes of oblique growth, one or more stem scars in addition. Below there are numerous roots, often stripped of their cortical layers, and piercing the cortex of the rhizome through characteristic openings. They enter the cortex of an upright rhizome at an angle of about 45 degrees, are

more numerous in the newer growth near the crown and are often decayed in the older parts of the rhizome. The lower portion of the rhizome, representing growth two or more years old, often decays and disappears causing the rhizome to end abruptly. The color varies from light brown to yellowish; fracture of the rhizome tough and horny; odor slight; taste bitter.

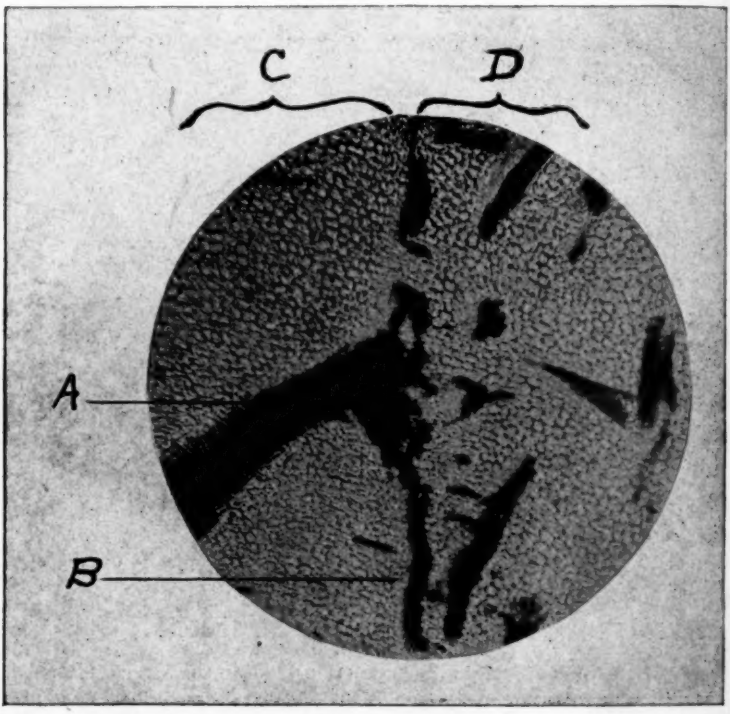


FIG. 4. Radial-longitudinal section of the central portion of Helonias rhizome. *A*, entering root, showing manner in which the root divides just inside the pericycle, and connects with the vascular system of the rhizome. *B*, endodermal layer; *C*, cortex; *D*, central cylinder.

Helonias rhizome presents a most interesting structure, and is a fine illustration of the fact that nature refuses to follow man-made laws. Fig. 2, a transverse section through the central portion of a seedling rhizome, shows the foramina spoken of by Millspaugh, cut obliquely. They may appear in any portion of the cortex, and as will be later shown, vary in size and appearance according to

their location. Narrow bands of trachea extend from the epidermis entirely through the cortex, to and even through the pericycle. There is no distinct endodermal layer and the mestome strands are of the collateral type.

Fig. 3, a radial-longitudinal section through the cortex of helonias rhizome, shows a foramen in longitudinal section. The walls

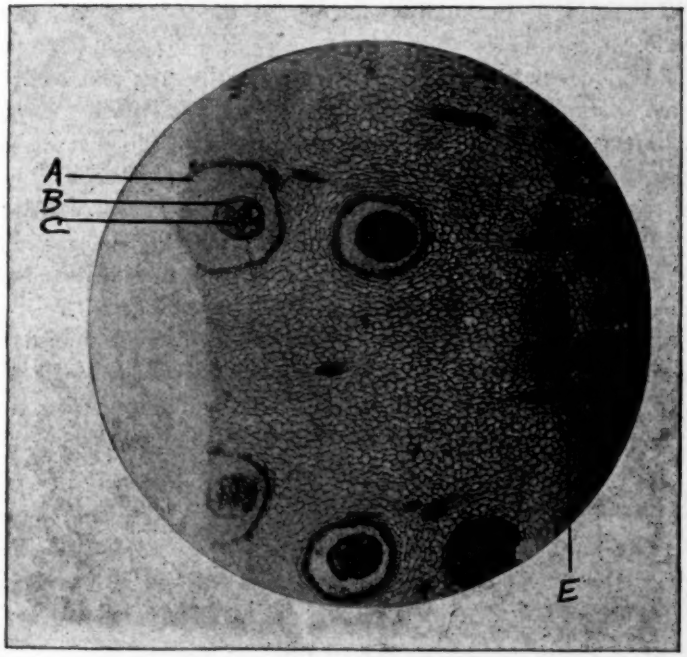


FIG. 5. Section of Helonias rhizome, cut at right angles to the entering roots, or at an angle of about forty-five degrees. This section shows five roots entering the cortex through their respective foramina. It will be noted that the cortex of the roots gradually narrows as the roots approach the central cylinder. It also gives an excellent view of the tube walls, which are seen to be uniformly thickened. *A*, tube wall; *B*, endodermal layer of root; *C*, pentarch mestome; *E*, endodermal layer of rhizome.

of these root-carriers are made up of longitudinally elongated cells which are regular, moderately thickened and lignified, reacting to phloroglucin.

A continuation of this tube with the root in place is shown in Fig. 4, ending just inside the pericycle. Here the mestome of the

root divides, connecting with and forming part of the vascular system of the rhizome.

Fig. 5 shows an oblique section of a portion of helonias rhizome, cutting the root-carrying tubes with their contents at right angles. The walls of the root-carrying tubes consist of from one to three layers of cells which are uniformly thickened. The epidermis of the contained root has disappeared and the cortical parenchyma, somewhat altered, gradually narrows as the root approaches the pericycle.

The endodermal layer of the root, enclosing the pentarch radial mestome, persists practically unchanged until it reaches the pericycle. Here the endodermal layer disappears, while just inside the pericycle the mestome divides, sending out branches of the collateral type. Helonias is thus shown to possess characteristics that enable its identification to be accurately and quickly determined. It should be added as diagnostic aids in the study of the powder, that helonias rhizome contains much starch and numerous cells filled with bundles of raphides of calcium oxalate. The endodermal cells of the root are thickened on their inner walls, have a narrow lumen, and very numerous simple pores, the radial walls appearing sinuate from their close proximity. Root hairs are very numerous.

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## A THESIS ON TOPICAL APPLICATIONS, THE METHODS OF PREPARATION AND MEANS OF DISPENSING, FOR THE TREATMENT OF DISEASES OF THE EYE.

SUBMITTED BY C. ELBERT HOFFMAN, P.D., P.C.P., 1909, FOR THE DEGREE OF MASTER IN PHARMACY, PH.M., IN THE PHILADELPHIA COLLEGE OF PHARMACY

Realizing that the products of some of the pharmaceutical methods have been unsatisfactory from the standpoint of the practicing pharmacist as well as the practicing ophthalmologist, the author presents this thesis with the knowledge that the products secured by the careful following of its formulæ are not only highly eligible but present the compounds or mixtures in the most effective form.

While the work on glycerite of boroglycerin is entirely original I am indebted to Dr. Conrad Berens for his encouragement and suggestions in my investigation.

BOROGLYCERIN.

| | | Gm. |
|---|---|---|
| ℞ | Boric acid | 620 |
| | Glycerin—a sufficient quantity to make | 1,000. |

Heat nine hundred and twenty grammes of glycerin in a tared porcelain dish to a temperature between 150° C. to 160° C. and add the boric acid in portions, stirring constantly until all the boric acid is dissolved and continue the heat until the mixture has been reduced to 1,000 grammes.

GLYCERITE OF BOROGLYCERIN, 60 PER CENT.

| | | Gm. |
|---|---|---|
| ℞ | Boroglycerin | 600 |
| | Glycerin—a sufficient quantity to make | 1,000 |

Heat the boroglycerin and 600 grammes of glycerin in a tared porcelain dish to a temperature between 150° C. to 160° C., until the mixture has been reduced to 1,000 grammes. When made according to the above formula this glycerite of boroglycerin has the specific gravity of 1.35 at 25° C.

*Glycerite of Boroglycerin in the Treatment of Trachoma, "Granular Conjunctivitis."*

Trachoma is a disease of the conjunctiva palpebrarum characterized by infiltration of the follicles, which are distended by the products of the inflammatory processes.

It is highly contagious and when neglected often destructive of vision.

The writer's attention was called to the promising action of glycerite of boroglycerin made according to the old formulæ and he was urged to attempt the task of improving it by increasing its percentage of boric acid and rendering the product anhydrous.

In the pursuit of these objects entirely new methods of preparing glycerite of boroglycerin were devised, especially in the application of heat and the attainment of what heretofore appeared to be forbidden temperatures.

The formula evolved by a long series of experiments is herewith presented.

The product is anhydrous and contains 60 per cent. of boroglycerin, which contains 62 per cent. of boric acid, and in the hands

of many skilled ophthalmologists has proved of inestimable value in the treatment of trachoma, indeed frequently causing a complete recovery and without cicatrices.

Of the formulæ for the other medicaments it may be said that in several instances the refinements in method of compounding have resulted in more perfect, efficient and eligible preparations.

### Ointment of Glycerite of Boroglycerin.

| | Gm. |
|---|---|
| ℞ Glycerite of boroglycerin | 20 |
| Sodium borate | 2 |
| Spermaceti | 20 |
| White wax | 20 |
| Oil of sweet almond | 38 |

To the spermaceti and white wax which have been melted add the oil of sweet almond and continue the heat to a temperature of 80° C. To the glycerite of boroglycerin add the sodium borate and bring to a temperature of 120° C. and continue until all of the sodium borate has been dissolved. Add the mixture of the glycerite of boroglycerin and sodium borate to the oil mixture and stir rapidly and continuously until the ointment congeals and becomes of a uniform consistence.

This ointment is very hygroscopic and must be placed immediately in sealed tin tubes or air-tight containers.

### Ointment of Citrate of Copper in Glycerite of Boroglycerin.

| | Gm. |
|---|---|
| ℞ Citrate of copper | 8 |
| Glycerite of boroglycerin | 80 |
| Wool fat | 2 |
| White petrolatum | 10 |

Heat the glycerite of boroglycerin to 125° C. and slowly add the citrate of copper and continue the heat until all of the citrate of copper has been dissolved. Remove the heat and when the mixture has cooled to 75° C. add the wool fat and white petrolatum and stir constantly until it has cooled to 50° C. and transfer to airtight containers.

Copper citrate was brought to the writer's attention as being a most valuable agent in the treatment of certain varieties of trachoma and of disturbances of the follicles of the ciliæ.

The objection to all former preparations of copper citrate was the inability to procure a base that would dissolve the copper citrate.

After many experiments it was found that copper citrate was soluble in glycerite of boroglycerin and in this way it is possible to make a perfect and permanent ointment.

### Ointment of Iodoform.

| | Gm. |
|---|---|
| ℞ Iodoform, in very fine powder | 10 |
| White petrolatum | 90 |

Heat a white porcelain mortar to 60° C. and rub the iodoform with a small quantity of the white petrolatum, then incorporate the remainder of the white petrolatum and triturate until it congeals.

Iodoform is very valuable in ointment form, used as a dressing for wounds of the ocular region.

For this purpose it should be divided as finely as possible; there should not be visible even with a powerful lens the minutest crystals, for if present they act as irritants.

In all ointments of iodoform and combinations thereof white petrolatum has been found to be the best base.

### Ointment of Cassaripe.

| | Gm. |
|---|---|
| ℞ Cassaripe | 10 |
| White petrolatum | 90 |

The cassaripe is heated to 60° C. and the white petrolatum is slowly added and the mixture stirred until it congeals.

Cassaripe ointment is now commonly used in the treatment of corneal ulcer.

### Ointment of Corrosive Mercuric Chloride.

| | Gm. |
|---|---|
| ℞ Corrosive mercuric chloride | 1 |
| Sodium chloride | 1 |
| Distilled water | 5 |
| Wool fat | 20 |
| White petrolatum to make | 5,000 |

Dissolve the corrosive mercuric chloride and the sodium chloride in the distilled water and add the wool fat and white petrolatum and mix thoroughly.

This ointment is a good base for other remedies, providing they contain no incompatible substance.

### Ointment of Yellow Mercuric Oxide.

| | Gm. |
|---|---|
| ℞ Yellow mercuric oxide | 1 |
| White petrolatum | 99 |

In a white porcelain mortar which has been heated to 60° C. place the yellow mercuric oxide and triturate with the white petrolatum, the latter a little at a time until the oxide is completely incorporated.

The yellow mercuric oxide should be made by the wet process for this ointment.

The finished product must be absolutely free from any visible particles of the oxide even when a thin film is spread upon clear glass.

This ointment is probably more frequently used in ophthalmic practice than any other.

### Alkaline Antiseptic Solution.

| | Gm. |
|---|---|
| ℞ Camphor | |
| Thymol, aa | 0.54 |
| Sodium chloride | |
| Sodium benzoate, aa | 5.40 |
| Sodium bicarbonate | 11.00 |
| Oil of spearmint | .60 |
| Oil of eucalyptus | |
| Oil of pine needles, aa | .90 |
| Alcohol | 10.00 |
| Glycerin | 27.00 |
| Water, q.s. | 1,000.00 |

It is the purpose of the above solution to act as an alkaline cleanser and render the parts aseptic and produce exosmosis.

In order to have this exosmotic effect it will have to be of a specific gravity lower than 1.020. This solution when made according to the above formula at a temperature of 70° F. will have a specific gravity of from 1.0185 to 1.0190. The alcoholic strength is reduced to a minimum so as to lessen the irritating effects.

This preparation is used as an eye lotion because of its thorough cleansing, antiseptic properties.

The alkalinity is just sufficient to make it act as a good cleansing agent.

FORMALDEHYDE PRESERVING JELLY.

| | | |
|---|---|---|
| ℞ | Gelatin | 1 ounce |
| | Solution formaldehyde | 2 drams |
| | Egg albumen | ½ ounce |
| | Glycerin | 8 ounces |
| | Water | 20 ounces |

Break the gelatin into small pieces and allow it to soak in twelve ounces of water for ten hours, then transfer to a porcelain vessel, add the egg albumen and the remaining eight ounces of water and the glycerin; heat until all of the egg albumen has coagulated, allow to simmer for ten minutes, filter, and while still liquefied but cooled to 60° C., add the solution of formaldehyde and allow to congeal.

This preparation is used for the preservation of eye specimens and is most satisfactory as it is almost perfectly transparent.

For preserving a specimen the jelly having been carefully heated to liquefaction only is poured over the specimen and the container sealed.

Working with the following substances I have accumulated the following practical experiences.

*Acacia* is generally employed as a mucilage; when used as a powder vehicle should be in as fine a state as possible.

*Acid Boracic,* in eye lotions, is generally used from 1 per cent. to 4 per cent. solutions and in ointment forms from 5 per cent. to 10 per cent. In every instance the chemically pure drug only should be used.

*Acid Picric:* in making solutions there should be 50 per cent. of glycerin; the ointments should have the acid in solution before incorporation.

*Acid Salicylic,* to be used in ointment form, should first be dissolved in a small percentage of olive oil, and then incorporated with the base.

*Alcohol* as a stimulant in eye lotions should not exceed 2 per cent.

*Alum* is generally used in solution in combination with boracic acid. Borax should never be used in combination with this chemical.

*Antipyrine,* when prepared for eye solutions, should never be dispensed with tannic acid, calomel or the salicylates. It is gen-

erally used in aqueous solutions, ranging from 5 per cent. to 10 per cent.

*Aqueous Solutions* for ophthalmic use should be carefully filtered before being dispensed.

*Aqua Camphoræ:* it is important that all alcohol be evaporated in the preparation of this solution for ophthalmic use.

*Argyrol* should always be freshly prepared with distilled water and dispensed in a dark bottle.

*Aristol,* when prepared for eye work, should always be dissolved in sterile olive oil.

*Atropine,* when used in its alkaloidal state, should first be dissolved in olive oil and then incorporated in ointment form or further diluted with the oil for dispensing.

*Boroglycerin* and its compounds have been previously described.

*Calomel,* for ophthalmic work, should be an amorphous powder. It should never be dispensed if the patient is known to be taking iodides.

*Chlorine Water.* This solution, for ophthalmic work, should consist only of the gas in water from 0.4 per cent. to 0.5 per cent. solution. As a compress a drachm of this solution to eight ounces of hot water is about the proper percentage.

*Cocaine,* when used in the alkaloidal form for local anæsthesia, should be dissolved in freshly sterilized olive oil. It should never be dispensed in combination with zinc or sodium salts.

*Collodion,* when used on wounds in the ocular region, should contain a small percentage of iodoform.

*Copper Sulphate,* when dispensed for eye work, should contain a small percentage of glycerin. It should never be used after applying an alkaline or silver nitrate solution.

*Copper Citrate* is used as an astringent in combination with glycerite of boroglycerin.

*Ethyl-morphine hydrochloride* forms a saturated solution at 10 per cent. It is generally prescribed in from 3 per cent. to 10 per cent. solutions and frequently in combination with atropine or eserine and should be dispensed in dark glass.

*Fluorescein* is used in solution for staining ulcers. The solution acts best when of 2 per cent. strength rendered alkaline with the addition of 3.5 per cent. of sodium bicarbonate.

*Gelatin* is used in the manufacture of ophthalmic discs and for making formalin preserving jelly previously described.

*Glycerin* is generally used as a solvent and in the preparation of other compounds.

*Holocaine* is the most delicate substance we work with. Glass vessels should be avoided in preparing and preserving the solution, as the small quantity of the alkali derived from the glass precipitates the drug. Porcelain should be the container of choice.

*Homatropine hydrobromide* is generally prescribed in from 2 per cent. to 3 per cent. solution rendered sterile.

*Hydrastis.* When this preparation is written for in liquid form the colorless preparation should be dispensed.

*Iodoform.* The mode of preparation for ointment has been previously described. When dispensed in powder form boracic acid is the best diluent.

*Mercury* is a most important chemical in the manufacture of ophthalmic pharmaceuticals. The bichloride of mercury and yellow oxide of mercury ointments have been described. The other salts of mercury are generally prescribed for internal use. Metallic mercury is usually dispensed as mercury ointment 50 per cent. U. S. P.

*Pilocarpine* and its salts are incompatible with tannin, iodides, alkalies, corrosive sublimate and silver nitrate.

*Potassium Iodide* is used both internally and externally in ophthalmic work. In ointments it should first be dissolved in water at saturation and then incorporated with wool fat.

*Physostigmine* or *Eserine* solutions should always be dispensed in dark bottles. Solutions that have acquired a dark color should be rejected.

*Silver Nitrate* is used both in crystal form and in solutions and must be dispensed in dark glass.

*Sodium Borate* is generally prescribed in solution as a detergent.

*Sulphur,* when prescribed in ointment form, should be carefully incorporated with a white petrolatum base.

*Zinc Salts* are generally prescribed in solution. In the preparation of the solution all borates must be avoided.

Pipettes or medicine droppers, for use with ophthalmic solutions, should be regulated to such a point that one drop will be equivalent to one minim. After very many tests it has been found that a dropper 2.2 Mm. outside dimension with an opening 1.1 Mm. and the wall of the glass barrel 1.1 Mm. on each side will form as nearly as possible a minim drop.

Potash-lime glass should be used for this purpose as it can be worked more exactly.

The width of the pipette after tapering from the point should be of such a diameter as to consume the entire amount of liquid that will be drawn up by releasing the pressed rubber bulb. In this way no liquid will come in contact with the rubber.

A dropper with a flange should be used only with solutions intended as eye lotions. This flange makes it less harmful should the tube accidentally be forced against the eye.

Bulbs are next to be considered. These are supplied in several colors according to the composition. All bulbs will oxidize to a certain extent and it is this uncombined substance on the inner surface of the bulb that works its way into the solution and when applied to the eye causes considerable irritation.

In all cases the bulb should be most thoroughly cleansed before dispensing. Collapsible tubes for all ointments and glycerites are by far the most convenient and sanitary method for dispensing.

A tube for this purpose must be made of pure tin and finely finished.

Different preparations require different sizes of openings for the release of the contents. In any case the cap must fit securely and seal the package.

After a tube has been deprived of some of its contents it is always advisable to thoroughly cleanse the tip before replacing the cap.

A bottle with a dropper stopper is the most satisfactory method of dispensing eye drops.

Solutions ranging from twenty minims to one half ounce can easily be dispensed in a half-ounce bottle.

The bulb is made with an enlargement on the outside so that it can only go just so far into the neck of the bottle and has a groove on the inside which is filled by the flange on the top part of the glass barrel. This groove serves to answer two very important purposes. It prevents the glass barrel from moving up or down and with the bulb properly fit into the bottle allows the glass barrel to come very close to the bottom of the bottle.

Eye drops bottle should be fitted with a glass barrel that will correspond to the dimensions given under pipettes where one drop is equivalent to one minim. The eye lotion bottle is made under the same conditions, only of a larger capacity. In this case a dropper of almost any size may be used.

Eye baths are used where it is the intention to have the solution

come and remain in contact with the eye for a considerable space of time. The cup is partially filled and in this condition is pressed against the eye, the head is thrown back and the lids of the eye are opened and closed several times.

Eye baths are made in various designs and combinations. The one most commonly used is the glass one with a shaft and base.

The aluminum bath is an excellent one because it can be easily sterilized without danger of breaking.

Eye irrigator: This apparatus is by far the most sanitary of any appliance used for washing the eye with a fluid.

It consists of a bottle of about one and one half ounce capacity and a curved metal tube, which extends from near the bottom of the bottle to about three inches curved out from the top, which carries a very fine stream and is forced out under air pressure. In this way the solution remains in a perfectly sterile condition until used.

The force of the flow is somewhat lessened by having the end of the tube slightly enlarged.

The flow is very easily checked by turning the bottle half on its side so that the tube carrying the liquid is not immersed at the end.

This little appliance is so complete that it can be operated perfectly with one hand.

Eye patches are used where it is the intention to protect the eye completely from light. These come in various colors, combinations and styles. The best patch is the soft-linen patch as it is more comfortable and acts as a better protector.

These come for right and left eye and in combination. They are also used to support compresses.

### Ophthalmic Disc Containers.

These generally come in two styles, the vial and the celluloid case. The celluloid case is the more practical; it being pure white enables one to see the disc more readily.

The disc can easily be removed for application by moistening the tip of a camel's hair brush to which it will readily adhere and may then be carried directly to the conjunctival sac.

When a physician prescribes smoked glasses to be worn during mydriasis it is his intention that the patient be supplied a glass that will protect the eye from as much light as possible.

Under these conditions the best glass to furnish is a glass with very large lens and which for its support does not depend upon a bridge but rests against the sides of the nose and eyebrows.

### Bottle with Bulb for Flushing.

This consists of a bulb of about two ounces capacity and a large wide-mouthed bottle of eight ounces capacity having a glass cover.

The outfit is for use where it is the intention to flush the eye with a large quantity of fluid.

The bulb fits the bottle in such a manner that it becomes air-tight after pressing and placing the end of the dropper into the bottle to the body of the bulb and releasing the bulb.

The dropper barrel for this appliance should be considerably larger than one used for eyedrops so that the flow will be much greater and with less force.

Ointment pots or jars for dispensing eye ointments should be composed of opal glass. There should be no metal covering used unless protected from the contents by paraffine paper. A very good jar to use is one composed entirely of glass; or one where the base is of opal glass and the cover celluloid.

Glass Applicators are small devices for the application of ointments or semi-solid substances to the eye. The more common is the plain piece of glass slightly tapered at the ends on which the medication can be placed and transferred to the eye.

An applicator more adapted to ointments is flattened on one end and rounded so as to remove all sharp edges.

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## CRITICISMS AND SUGGESTIONS ON MAGMA MAGNESIA.[1]

By Sister Bertha Mueller, Assistant Apothecary at the German Hospital, Philadelphia.

Ever since the proprietary preparation, milk of magnesia, has been placed on the market and become so popular, attempts have been made by the pharmaceutical profession to develop a good working formula for the making of that preparation, but so far all

[1] Read at the annual meeting of the Pennsylvania Pharmaceutical Association, June 19–21, 1917.

the formulas advanced have been only partly satisfactory. Let us just briefly review some of the shortcomings of the most important formulas.

We all know, for instance, that the N. F. III formula was unsatisfactory in that it took actually months for the magma to settle down to the required volume. Of course, in order to avoid that inconvenience, directions were given to transfer the magma to a muslin strainer and allow to drain. That, however, is not a very satisfactory way of doing, because of the messiness attending the process. Furthermore, by bringing the magma down to the required volume in order to have a preparation in accordance with the N. F. III requirements, one incurred the still greater embarrassment of having a product that was not pourable. To correct this shortcoming, various modifications of the formula were suggested, such as boiling the magma, reducing the amount of water, etc. As all these changes, however, proved more or less unsuccessful, the conclusion was drawn that it was practically impossible to prepare a satisfactory magma by the interaction between magnesium sulphate and sodium hydroxide. Some other chemical, it was thought, was necessary to react with sodium hydroxide in order to obtain a satisfactory preparation. Hence, in the present U. S. P. formula the magnesium sulphate is replaced by magnesium carbonate; a change which is unfortunate. In the first place, magnesium carbonate is at all times more expensive than magnesium sulphate. Secondly, the sodium carbonate resulting from the interaction between magnesium carbonate and sodium hydroxide is necessarily considerable, and for that reason the preparation requires a great deal of washing in order to free it from the nauseating alkaline taste which sodium carbonate, as long as the merest trace is present, lends to it. Lastly, magnesium carbonate, being insoluble in water, cannot possibly be freed from those accidental mechanical impurities which are present in all chemicals in varying amounts. Therefore, this feature of insolubility is a matter of no small consideration, for if we wish to have a first-class preparation, it must, above all things, be free from an admixture of mechanical impurities.

In recent years still another method has been advanced, which, if it only yielded a more satisfactory product, would indeed, to the busy pharmacist, be a very welcome method. The chemical, marketed for the express purpose of preparing magma magnesia by this method, is said to be a hydrated magnesium oxide which, in order

to prepare the magma, is simply mixed with water, allowed to stand for twenty-four hours, shook up, and the process is completed. We have tried that method, but find it does not yield as satisfactory a preparation as one would wish it to be. In the first place, the magma is rather grayish in color, probably due to insufficient purification of the hydrated magnesium oxide. Secondly, the magma does not stand up well; is quite gritty, and if allowed to stand for some time, cakes into a solid lump, which appears rather gluey and is very hard to shake up. It is indeed to be regretted that hydrated magnesium oxide, as it is marketed at present, falls short of yielding a satisfactory magma; for the fact remains that this method would be the ideal method. It is to be hoped that the manufacturers of hydrated magnesium oxide will continue to work with the chemical with a view to improving it so that eventually it can be made to yield a satisfactory product.

Perhaps it would not be amiss right here to draw attention to the fact that the beautiful white color, which some very popular brands of milk of magnesia appear to have, but in reality do not have, is achieved by bottling the magma in glass bottles of a strikingly beautiful pale blue tint. How simple and yet so successful a trick!

After considerable work on magma magnesia, it has been our experience that a really nice magma can be prepared according to the N. F. III formula, somewhat modified. If dried magnesium sulphate is substituted for the ordinary sulphate, and the amount of water reduced, no difficulty in working the formula will be experienced. It is a strange phenomenon, yet it is certain that dried magnesium sulphate exhibits different physical properties from ordinary magnesium sulphate. This feature is clearly brought out in making magma magnesia. If dried magnesium sulphate is used, a nice smooth magma is obtained which subsides very rapidly, indeed so rapidly that a fresh washing can be given it every ten to fifteen hours, which enables one to have the preparation finished in less than a week's time; while a magma prepared exactly according to the same formula, but with ordinary magnesium sulphate, is rather lumpy and requires at least several days to subside; thus considerable time is required for its manufacture.

The following formula has been tried a number of times by different workers, and has always produced the same satisfactory results:

| | |
|---|---|
| Magnesium sulphate, dried | 270.0 |
| Sodium hydroxide, U. S. P. | 120.0 |
| Distilled water to make | 1,000.0 |

Dissolve the magnesium sulphate in enough water to make 750 mils and filter; dissolve the sodium hydroxide in enough of water to make 250 mils; filter. Pour the sodium hydroxide solution into the magnesium sulphate solution; mix well, and bring up to 4,000 mils with distilled water. Wash by decantation, bringing up the volume each time to 4,000 mils. Continue washing until the supernatant liquor, when tested with barium chloride test solution, does not show more than traces of sulphate. When assayed by the official method, the magma contains not less than 6.5 per cent. nor more than 7.5 per cent. of magnesium hydroxide.

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## TINCTURA CINCHONÆ COMPOSITA.[1]

By Thomas D. McElhenie, Brooklyn, N. Y.

Imprimis: The most soluble form of the alkaloids of cinchona is the hydrochloride. It has always seemed to me in the course of fifty-odd years in the drug trade a very curious thing that the universally used salt of quinia at least in English-speaking countries should be the sulphate and that this should come in the course of successive generations to be so commonly the name that when quinine was mentioned "quinine sulphate" was understood to be the variety intended and neither the alkaloid nor any other salt was thought of for many years.

Probably the real reason was for the discoverers that they could make it that way cheaper, as the calcium sulphate was so easily got rid of.

Pondering thus, I have had in mind for a long time to try the merit of hydrochloric acid in the maceration of the ground mixed drugs for a lot of the compound tincture and on November 26, 1916, as a preliminary trial of the solvent effect of the weak acid one per cent. by volume on the reddish brown sediment always present in the finished tincture, after standing a month or so.

I had about 2,000 mils of the regular official tincture from a lot

[1] Read at the meeeting of the New Jersey Pharmaceutical Association, June 13, 1917.

dated May 27, 1912, and after shaking well I put into a quart packer marked for 1,000 mils and containing 10 mils of hydrochloric acid, enough of the turbid tincture to make 1,000 mils. This portion represented here by Sample *A* is at this date, May 30, 1917, entirely limpid, showing that the trifle of cinchotannic acid sediment with probably some little alkaloid carried down in it was entirely soluble in the 1 per cent. acid menstruum. The remaining portion of the stock of tincture, about 1,000 mils, was turned unfiltered into the shelf bottle for observation, on November 26, 1916, pouring off clear when needed. It has still of course the sediment as before or a little more about ⅛ inch deep in a quart shelf bottle. Shown here as sample *B*. In another quart packer on the same date I started 1,000 mils of the same tincture including 10 mils of acid to macerate until wanted when I confidently expect to percolate a perfectly clear tincture of the chlorides of the cinchona alkaloids which will remain clear, carrying all the alkaloids as chlorides, and the cinchotannic acid. After that lot has been finished a few months I will report on it if I am still in the harness. Perhaps at next year's meeting it will be an appropriate time. I cannot at present think of any prescription combination in which the slight trace of acid here suggested would be any way objectionable.

BROOKLYN, N. Y.,
May 30, 1917.

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## COMMERCIAL TRAINING FOR PHARMACISTS.[1]

BY ROBERT P. FISCHELIS, B.SC., PHAR.D.

The need for commercially trained pharmacists is an acute one if the trend of the profession is accurately recorded in the pharmaceutical press and in pharmaceutical meetings. It is therefore no longer necessary for those advocating commercial training to apologize for usurping a place in the pharmaceutical sun. On the contrary, many close students of the present-day pharmaceutical situation are beginning to wonder whether the time is not coming when those who have scientific papers to present before pharmaceutical associations will not in their turn open their remarks with

[1] Read at December, 1916, meeting of N. Y. Branch A. Ph. A.

an apology for taking up valuable time that might better be devoted to a discussion of business problems and financial profit possibilities.

What the whole situation requires is the acceptance of a common-sense viewpoint on the part of teachers, retailers, students and others who are interested in the practice of pharmacy of to-day. I am not in sympathy with those who wish to displace a large portion of the present minimum pharmaceutical curriculum with business training any more than I am in sympathy with those who begrudge even the small period of time—about 60 hours—that the better schools of pharmacy are devoting to the subject.

There must be a willingness to give and take in this matter if pharmacy is to be served properly.

We all recognize what pharmacy is to-day and it is foolish to try to make ourselves believe that it is on a higher plane than actual conditions demonstrate.

Our colleges of pharmacy are attempting to elevate the profession of pharmacy to their high standards and practical men everywhere are trying to make the colleges recognize the fact that in order to really serve the profession the colleges should take cognizance of conditions in the trade and adapt their curriculum to the situation in such a manner as to turn out men who would be trained and valuable for the present-day drug store. That, in a nutshell, is the situation and thus far many of the colleges have responded by instituting short courses in commercial training—with emphasis on the short.

It is expecting too much of both student and instructor in commercial pharmacy to feel that just because a college gives a short course in commercial training its graduates should make good as business men. To be sure they are much better prepared for business life after having taken such a course than they are without having taken it, but the other learned professors on the pharmaceutical faculties must also help to make our 1917 graduates and those who follow them good assistants to the average retail druggist of to-day or good business men in their own stores.

Those who advocate discontinuing some of the scientific instruction given in the present pharmacy course and substituting more commercial training for the same are often asked what branch of the curriculum may be eliminated or curtailed. Invariably the first subjects mentioned are botany and pharmacognosy.

Yet a knowledge of the habitat and characteristics of vegetable

drugs as well as climatic effects upon their growth, etc., is quite essential to the shrewd buyer. But how many teachers of botany and pharmacognosy ever handle the subject from this point of view? They are usually profound students of the subject and teach what custom dictates every educated pharmacist should know about these sciences and they usually teach it in a highly scientific way, regarding any commercial consideration of the subject as beneath their dignity.

It is necessary to remember that we are not, in this day and generation, teaching pharmacists who will go out and collect green drugs, dry and grind them and manufacture them into elegant preparation. We are teaching men who to-morrow will be in the thick of the fight for a living out of a business which has some professional trimmings but requires the ability to utilize these trimmings in a commercial way for success.

Chemistry is a big subject, which requires four years of undergraduate study and some more postgraduate work in our universities before it is felt that the student or graduate knows enough to speak with authority on the subject. Yet we try to make our men master chemistry in two short years and crowd the work in at an enormous rate, with the result that there is little time for absorption, because it is all needed for cramming. Chemistry is invaluable to the pharmacy student, but it should be handled from the viewpoint of the pharmacist. Our professors are victims of a system which does not recognize that the object of teaching chemistry in a pharmacy school is not to turn out chemists but to turn out good pharmacists, just as the object of teaching botany is not to develop botanists but better pharmacists. Here, too, a consideration of the commercial aspects of the subject from the pharmaceutical standpoint is a crying need.

The time has come when the traditions of the past must be shaken off, for they have burdened us heavily for too long a time.

Commercial training must mean more than bookkeeping, accounting, selling and advertising in the future. It should be considered in connection with every subject in the curriculum and the men now teaching the various subjects at our colleges will find a keener interest in their work, on the part of students, if it is approached from the present-day retail druggists' standpoint. And further than this, the colleges will then be fulfilling their mission, which is to provide trained men to meet the needs of the hour.

# PRODUCTION OF HYDROGEN BY THE IRON CONTACT METHOD.[1]

By Harry L. Barnitz, Ph.G.

One of the methods that has found favor in recent years for the production of hydrogen in installations of large commercial capacity is the so-called "iron contact method."

The generating elements employed by this method are coke and water, and through them hydrogen can be produced of almost "chemical purity," *i. e.*, of a purer grade than by many other technical processes for large production excepting electrolytical.

The iron contact method is cyclic with respect to the "iron contact mass"; that is, this iron contact mass is used over and over again. If red hot iron is sprayed with a jet of steam, the iron is oxidized and forms iron oxide, while hydrogen is liberated. If the iron oxide thus produced is treated with reducing gases, such as generator gas, water gas or illuminating gas, the iron oxide is reconverted into sponge iron.

All these reducing gases consist chiefly of a mixture in varying quantities of carbonic oxide, hydrogen and hydrocarbons.

For instance, the commonly employed water gas, which is easily produced by means of coke and steam in producers of large working capacity (say up to 100 cubic meters per hour), gives a theoretical mixture of 50 per cent. CO and 50 per cent. H. In practice, however, this gas always contains large quantities of impurities, emanating from the coke during the process of generation, averaging about 6 per cent. N, 4 per cent. CO and 2–3 per cent. hydrocarbons and sulphides.

The reactions used in the iron contact process may be represented by the following formulæ:

(1) Oxidation: $Fe + H_2O = FeO + H_2$.
(2) Reduction: $2FeO + H_2 + CO = 2Fe + H_2O + CO_2$.

It will be observed that equation (2) is exactly the reverse of equation (1) at least as far as steam is concerned.

The reaction takes place at the surface of the "contact mass." Only where the fresh gases enter, a powerful and far-reaching re-

[1] Reprinted from Metallurgical and Chemical Engineering, Vol. XVI, No. 10, May 15, 1917.

action generally takes place, while the reaction generally decreases in intensity in the direction of the outlet of the gas.

Compact iron, such as waste or filings, is little suited as contact substance for the process, but iron oxide, either artificial or natural, *e. g.,* iron oxide clay briquettes or iron ore, are eminently suitable. All these substances become more or less porous during the reducing process.

Theoretically speaking, the contact mass could be used over and over again indefinitely in accordance with the before mentioned formulæ, so that an unlimited quantity of hydrogen could be produced by means of a limited quantity of contact mass.

In practice, however, a limit is placed to the life of the contact mass by the fact that as it is only the surface of the latter that is being acted on, the substance gradually becomes impregnated by the dust, silicic acid and sulphides liberated by the gases. These impurities form a layer on the surface, diminishing the reacting capacity, so that the yield of hydrogen is gardually lowered and other disadvantageous combinations take place.

It is necessary, therefore, to renew the contact mass periodically, say after the plant has been in operation for from 8 to 30 days.

The principal difficulty with the iron contact method arises from the fact that a considerable amount of heat is absorbed during the various stages of the process by the chemical reaction. It is therefore not easy to keep the contact mass at a correct temperature without overheating.

If overheated, the contact mass loses its porosity, cakes and even melts. This renders the replacing of the contact mass difficult or even impossible. The action of the gases becomes defective and the yield of hydrogen falls considerably, as channels and cavities are formed which can no longer be acted upon regularly by the gas and steam.

As the iron contact method is very old, all kinds of suggestions have been made in the course of time in connection with the practical method of dealing with this process.

A voluminous mass of patent literature on this subject is in existence. Only the most important of these patents, most of which have long ago expired, are here passed under review.

*Giffard,* who made the method public in 1878, may be considered the discoverer of the method. He employed a shaft filled with ore which he heated and reduced by means of gases coming from a

producer connected with the shaft and which passed through a dust chamber, in order to remove the particles of dust introduced during the operation. The defect of this system was that the ore was easily contaminated by the impurities contained in the gases and that a sufficiently high temperature could not be maintained.

In 1889 *Claus* (English Patent No. 50) published a method for the production of hydrogen in a shaft furnace. He too employed "porous though solid blocks of iron oxide" which he alternately reduced with water gas and oxidized by means of superheated steam.

*Walker's* English patent 8373, dated 1890, describes the operation of the contact method in iron retorts, which were heated in a retort furnace from the outside. He employed water gas for the reduction.

In 1892, the firm of *Krupp* published various improvements of the process (D. R. P. No. 73,978) which, however, did not produce satisfactory results and were ultimately rejected.

Iron ores were employed in heated shafts or retorts and attention was drawn to the importance of employing reducing gases as rich as possible in hydrogen with a minimum of hydrocarbon.

*Stracke* returned in 1893 to the Giffard shaft furnaces (German Patent No. 77,350) and filled a shaft furnace with layers of "iron, iron oxide and ore in any form," heating and reducing the whole by heated generator gas or water gas which he introduced through the ore from the generator. He used charcoal in the generator in order to avoid the formation of sulphur compounds while producing exceptionally pure gas. The waste gases formed during the process of reduction were completely consumed in a superheater with fireproof cage-work which served to raise to a high temperature the steam used in producing the hydrogen. Here too the heating was insufficient.

*Schimming* took out a German patent No. 95,071 for the preliminary heating of the reducing gases which he achieved by blowing air into the reducing shaft in order to cause combustion of a portion of the reducing gas. This method had the grave defect of overheating and melting the ore at the entrance, while the ore further away was not sufficiently heated. He tried to remedy this defect by mixing pieces of fire brick with the contact mass in order that the former might retain a portion of the heat, but the system involved serious drawbacks.

*Caro* in German patent 249,269 tried to overcome the want of

uniformity in the heating by introducing air to the ore mass at various points during the reducing process. It is evident that under this system the reducing capacity of the gases was seriously affected, so that the yield of hydrogen was altogether too low.

*Lewes's* English patents 4134 and 20,752, dated 1890 and 1891, once more describe the iron contact method in detail. He proposed to lay a retort with iron contact mass directly through a water gas generator, which was technically hopeless owing to the consequent overheating. He proposed for the first time to employ porous briquettes made of iron oxide and clay or asbestos and then pressed and burned. He employed water gas for reducing, justly pointing out that the use of such gas rich in hydrogen greatly accelerated the process of reduction.

*Hills* describes in his English patent 10,356, dated 1903, the production of hydrogen by the iron contact method, which he proposes to carry out in iron retorts. Unimportant improvements in the apparatus employed in the already well known process were patented by him. He used water gas for the reducing process.

*Elworthy,* in German patent 64,721, dated 1905, discusses the contact method exhaustively. He notes as the chief defects the tendency of the mass to melt and the choking of the retorts. He proposes to overcome this difficulty by using furnaces in which the spongy iron is contained in specially constructed fireclay holders. The use of iron in lumps of varying size is taken for granted. By "iron" he always means spongy iron produced by reduction from iron oxide or iron ore, as, he explicitly states in his English patent 12,461, dated 1902, he employs water gas for the reducing process.

*Lane* repeatedly constructed installations in Russia, France and England about 12 to 14 years ago on the iron contact method. He used chiefly briquettes similar to those suggested by Lewes, made of iron oxide and clay which were reduced by water gas in iron retorts, in large iron retort furnaces. The installations proved, however, to be of inferior working capacity, as in the case of the proposals made by Walker (1890) and Hills (1903), and were nowhere a success.

*The International Hydrogen Company,* whose shares are held by the Berlin Anhalt Machine Construction Company of Berlin, thereupon "discovered" the identical method for the hundredth time. The result was the same as in all other previous cases.

The inevitable difficulty of the retort system lies in the fact that

the retorts are destroyed by fire after being a short time in operation (about six weeks) besides being choked by the ore.

In a large installation now in operation every charge for the 32 retorts for two furnaces with a capacity of 100 cubic meters costs about $3,000.

As these retorts produce 100,000 cubic meters before being rendered useless by fire, one cubic meter of hydrogen costs for the replacing of retorts alone $3,000 ÷ 100,000 = 3 cents. Apart from the high cost of production involved in the production of hydrogen by the retort method, other drawbacks, such as continuous repairs, loss of hydrogen by waste, interruption of operating plant, excessive, unbearable heat, and early destruction of the furnaces are so serious that the system is not to be recommended.

The mere fact of the imperfect preparedness for operation makes it unsuitable for airship purposes, as the furnaces have to be heated gradually for several days before they begin to produce gas. The heating of the retort furnaces entails the use of a special system of coke firing, built in the retort furnaces, and involves the use of a considerable amount of coke (about 1,200 to 1,500 kilos per furnace daily).

The oldest system employed by Giffard, already referred to, undoubtedly possessed important advantages over this system, but the difficulty of heating was a very serious one, as is shown by the above mentioned extracts from the patent literature on the subject.

Recently, however, after exhaustive experiments many of the difficulties connected with the rational carrying out of the iron contact method in large industrial plants have been to a great extent overcome by the vertical cylinder process and installations.

The method has now been so much improved by the application of entirely new principles that it meets to a certain extent the requirements of a process adapted to large installations, such as rapidity in getting the plant into working order, more certainty of operation, and simplicity. The vertical cylinder generator is distinguished by separate heating and contact chambers communicating with each other. The former serve for the uniform heating of the contact mass, as well as for the super-heating of the steam. The heating takes place at intervals, yet it is continuous, because when the heating is discontinued, the super-heating maintains the temperature of the contact chamber by its radiation and continues to heat the contact mass.

The application of this principle explains the high generating capacity of this type of generators.

Owing to the separate chambers, the vertical cylinder generators may further be heated directly by the still combustible waste gases liberated during the reducing process. They require, therefore, no expenditure for heating material or special heat generators with workmen in attendance, as they are self-heating. This gives some advantage of an economy hitherto unattained. Losses of hydrogen, such as are inevitable by the retort process, are avoided by the use of the vertical cylinder type of generators, as no glowing particles of iron peel off the exterior of the apparatus, under pressure, owing to the generator being lined with fireclay.

Necessary repairs can be executed in a few hours without any lengthy interruption of work, as the inner parts can be easily withdrawn and replaced by a block and pulley arrangement. Any kind of reducing gas may be used in the vertical cylinder system of generators but it is best to employ water gas or half water gas.

A special arrangement further renders it possible to heat the contact mass, both directly and indirectly during the reducing process by means of which uniform heating is secured.

Many of the defects incident to former installations are avoided in the vertical cylinder system by replacing the contact mass in comparatively narrow circular layers which also secures uniform heating, reduction and oxidation by the corresponding streams of gas.

*Giffard* suggested ore as a contact mass. When properly treated, specular iron ore, red hematite and iron oxide hydrates have generally been found suitable. The use of purple ore was protected by patent 220,889 and that of sparry iron ore by patent 241,669 (dated 1911). The former has the disadvantage of containing too much sulphur and cakes easily, while the latter often melts too easily.

Their use, therefore, offers no advantages. As a rule briquettes act too slowly, owing to their defective porosity.

According to German patent 244,732 taken out by the International Hydrogen Company, spongy iron free from carbon can only be produced by reduction and out of it pure hydrogen, when instead of the usual water gas, a gas consisting chiefly of hydrogen, but absolutely free from hydrocarbons, is employed.

In practice this assertion has not been found to be warranted. Besides, the fact is unimportant, as there exists no practical method of producing such a gas.

The Badische Aniline & Soda Manufacturing Company has even admitted in a recently announced patent that a spongy iron produced by a reduction from iron ore by means of coal in Sweden for smelting purposes is suitable for the preparation of hydrogen.

Experts have long been aware that the maintenance of a proper temperature is indispensable for the production of spongy iron free from carbon. If this is done, any reducing gas, even pure carbonic oxide, may be used for reducing, but water gas has the advantage of acting more quickly, as has been decided by experts who investigated the matter several decades ago.

Many defects of the iron-contact method for production of hydrogen have been overcome in recent years, but there still remain further refinements to bring the process to its highest efficiency.

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## INVESTMENT IN MINES.[1]

It is quite probable that most of the people who buy shares in the stocks of mining companies do not care whether the mines are good or bad. Their money is put on the cards with certain mining names and they occasionally win, and often lose, with the rise and fall of the markets. The extraordinary feature of this game is that the more money the dealer collects in his pile, which of course is taken from them, and the richer he gets, the more confidence they have in him and the harder they play.

If it had been customary for the land to be tilled by agricultural companies incorporated under the Joint Stock Companies Act the names of such companies might have been substituted for those of mining companies, and any disrepute which might have been attached to the one name might have been transferred to the other. So that for any disrepute that the mining industry has, the Joint Stock Companies Act and not the mines are largely responsible.

I have nothing to say to such gamblers. They should be handed over to their clergymen for curative moral and religious treatment.

But there are men in the community who are interested in the development of the mining resources of the country, and who are prepared to follow their interest with some of their money. To such men a few remarks may be of interest.

First, let them disabuse their minds of the idea that mining is any

[1] Reprinted from the *Canadian Mining Journal*, 1917, p. 110,

sort of a game, to be played either over the table or out of doors. It is not an amusement or recreation or dishonest mode of making a living; but it is a serious calling and must be contemplated seriously if it is to be successful. The work may be pleasant or enjoyable, as any good successful work should be, whether that work is mental or physical; but it is none the less strenuous on that account.

Everyone will of course recognize that the actual supervision and operation of mines is serious and strenuous work, but many think that the investment of money in these same mines is gaming. This may be true or untrue, just as one may see fit to make it.

If the purchaser is willing to take the trouble to be an investor, and not a gambler, in mining stocks he must exercise the ordinary precautions that he would take if he were to put his money into any other business enterprise. He must remember that a mine, in whatever stage of its development, is a natural feature which embraces a definite portion of the earth's crust, and that it can be examined and valued by those who are accustomed to perform such work, just as a house or garden or farm can be valued, and that the men who invest on the advice of such valuators are reasonably certain to make good profits on their investments.

Most men who buy stock in mining companies buy on the advice of men interested in selling stock to them. The sellers may be quite honest, and their opinions may be backed up by those of others who are also honest, but nevertheless it is the duty of an intelliegnt business man to inspect what he buys, or to get some competent person in whom he can place confidence to inspect it for him, whether the object is a mine, a timber limit, a farm, a horse, or whatever it may be. If he does not have such inspection made he deserves to lose his money. Some people may argue that opportunities for good investments in mining properties are seldom offered, and when offered must be seized quickly or they will be snatched up by others. Take your time, and if a man tries to hurry you into a quick purchase without sufficient time for careful examination, no matter what pretext he may offer for the shortness of time at his disposal, refuse to do business with him; you will save money in the long run.

It may also be thought that it is almost impossible to make favorable investments in good mining properties or in stocks of good mining companies on account of the keen competition for such investments. But competition to be effective must be intelligent, and most of the so-called competition is neither the one nor the other. Unin-

formed buying is no competition to the careful business man; but on the contrary it often gives him an opportunity to secure bargains which he would not be able to get if other buyers were not wasting their money on trash. The purchaser of a mine or of mining stock, who purchases without knowledge or competent and independent advice, is not a formidable competitor to the man who knows thoroughly what he is purchasing. In spite of the wails and protests of those who have lost money by buying pieces of paper which they were gullible enough to believe would soon represent wealth to be derived from new mines, I have no hesitation in saying that at the present time investments in mines, if made intelligently and on competent and independent advice, will yield larger and more certain returns than investment in any other class of securities on the market.

There may be some timid mining engineers who will say that they do not invest any money that they may possess in mining securities. Such engineers must be avoided as financial advisers. If they have not sufficient confidence in their knowledge and ability to separate good mines from bad ones, and to stake their own money on that knowledge, you may take it for granted that they are not capable of judging of the value of mines in which others should invest. But there are engineers who make a study of the value of mines, and who are not afraid to put their money into them. The advice of such men will usually lead to successful investments. It may have nothing to do with the vagaries of the stock market, and it is rarely that a purchaser will buy on such advice stock which is selling at $2.00 to-day and which will be selling at $4.00 to-morrow, but he will buy stock in mines which have intelligent, honest directors, are well managed, have large ore reserves, and are certain to pay good dividends for years to come.

If the capitalist has money to spare, and wishes to take long chances in the hope of larger returns, he may be directed to buy stock or interests in mining properties in their early stages of development which have good prospects of becoming dividend payers, and be will be directed to avoid the many properties, no matter how glaringly advertised, which have no such prospects. In the case of such speculative purchases no advising engineer of any reputation or standing will guarantee success, but he will increase the chances of success manyfold.

Such speculative purchases are the ones usually thought of when men talk about "putting their money into mines," and the successes

that have fallen to the lots of the fortunate speculators have laid the foundations for many an attractive story. If a man wishes to speculate, let him do so, but let him be sensible and reduce the chances against himself as much as possible before he pays over his money. He should not accept a seller's statement that a hole in the ground, whether large or small, is of any value as a mine until he has taken the trouble to examine it for himself or has had it examined by some competent and independent valuator.

I have attempted briefly to draw attention to an ordinary business principle in common use among people everywhere throughout the country. If it is kept as constantly in view when mines, or interests in mines, are being purchased, as it is in other commercial transactions, we will soon hear less of the losses incurred in the purchase of worthless mining stock.

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## BOOK REVIEWS.

PRINCIPLES OF PHARMACY, by Henry V. Arny, Ph.G., Ph.D., F.C.S., Professor of Chemistry in the College of Pharmacy of Columbia University. Second edition, revised, with 267 illustrations. Octavo, cloth, 1056 pages. W. B. Saunders Co. $5.50 net; half morocco, $7.00 net.

Writers of textbooks on extensive subjects such as pharmacy, like editors of journals, are not confronted with the necessity of searching for material but must rather solve the difficult task of separating the essentials from the non-essentials. Professor Arny has, in his textbook, picked the wheat from the chaff with a skill that can only be acquired by long teaching experience and intimate contact with the pharmaceutical problems of the day.

The book is divided into seven parts. Part one deals with pharmaceutical processes and the arithmetic of pharmacy in a refreshingly concise yet understandable manner. Only sample problems are given in the section devoted to arithmetic, so that a textbook or class room problems on this subject are needed to supplement this chapter.

Part two deals with the galenical preparations of the pharmacopœia and those unofficial preparations considered worthy of notice. The numerous tables classifying these preparations as regards strength, method of manufacture, etc., are invaluable to the student

in summarizing the knowledge which has been imparted through lectures and book study.

Part three takes up the inorganic chemicals used in pharmacy and includes a discussion of chemical theories and chemical arithmetic.

The organic chemicals used in pharmacy are taken up in part four. The comments on individual compounds are preceded by an introductory chapter dealing with the theory and classification of organic compounds.

The analytic methods of the Pharmacopœia are summarized in part five and chemical testing is taken up in a manner which at once gives the student the proper point of view with regard to this phase of pharmaceutical work.

Part six takes up the prescription and valuable information regarding incompatibilities has been collected in this portion of the book.

Part seven consists of a set of laboratory exercises including problems in chemical arithmetic and equation writing. We should like to see this portion of the work extended sufficiently to fulfill the syllabus requirement for laboratory work in pharmacy.

A careful examination of the various chapters of the book shows that up-to-date information on many phases of pharmaceutical work has been included. For instance some space is devoted to a discussion of ampuls and methods of filling them. On the other hand, the subject of biological assaying, now recognized in the Pharmacopœia, is given scant attention.

Perhaps the greatest distinctive feature of this book is the excellent and extensive bibliography given at the end of each chapter. For student and teacher alike this is an invaluable asset and it alone makes the book a necessary addition to every working pharmaceutical library.

Just at this time, pharmacy is striving hard for the recognition it should receive from other professions and the government. In order to secure and hold such recognition it is necessary for pharmacy to demonstrate through its men and its literature that it is deserving of the prominent place which it craves.

Books like Arny's "Principles of Pharmacy" are a credit to the profession and will go far to give our craft the desired standing among the learned professions.

ROBERT P. FISCHELIS.

MATERIA MEDICA AND PHARMACOLOGY, a Manual comprising all Organic and Inorganic Drugs which are or have been official in the United States Pharmacopœia, together with the Important Allied Species and Useful Synthetics, by David M. R. Culbreth, Ph.G., M.D., Professor of Botany, Materia Medica and Pharmacognosy in the Maryland College of Pharmacy, Department of the University of Maryland, Baltimore, Md. Sixth edition, thoroughly revised, with 492 illustrations. Octavo, cloth, 1001 pages, price $5.25 net. Published by Lea and Febiger, Philadelphia and New York, 1917.

This familiar textbook on material medica and pharmacology has been thoroughly revised to conform to the Ninth Decennial Revision of the Pharmacopœia, and also includes references to the important drugs and preparations now included in the National Formulary.

The arrangement of the drugs remains strictly the same as that followed in previous editions, being based upon the principle of associating as nearly together as possible those substances, organic and inorganic, which have a common or allied origin, allowing those next related to follow in regular order, the basal or parental source thus being kept paramount.

Dosage and measurements are given in both the English and metric systems. While this is undoubtedly a convenience to some, it is a disadvantage to the teaching of medicine and pharmacy in view of the propaganda favoring the use of the metric system only, in the compounding, prescribing and dispensing of medicines. The sooner authors of pharmaceutical and medical textbooks confine themselves to the use of the metric system the sooner will it be brought into universal use. The Pharmacopœia and National Formulary have both ceased giving quantities of ingredients in preparations and dosage in the apothecaries' system and writers of textbooks should follow this example.

We note that the abbreviation Ml. is used to express milliliter throughout this work, whereas the official substitute for Cc. is the coined work *mil.* From the teacher's point of view this is particularly unfortunate as it gives the student consulting the official works and this textbook an idea that any abbreviation will do, when all the energies of the teacher are bent toward uniformity in this respect.

In the table on page 945 under "Prescription Writing" the author gives ml. as the abbreviation for milliliter and Ml. as the

abbreviation for myrialiter. Yet on the same page we find the statement that a cube measuring .393 of an inch on the side "contains of distilled water 1 Ml. (Cc.) weighing 15.434 grains and this furnishes the unit of weight (gramme)." While a matter like this has no great bearing on the value of the book as a text of materia medica and pharmacology, it does present an inconsistency which should be avoided in a textbook.

A number of new illustrations have been added and these are undoubtedly of considerable value in elucidating the text.

One would rather expect in a work of this kind to find some reference to the newer methods of standardization, especially those mentioned in the Pharmacopœia under biological assays. In the discussion of cannabis, for instance, no reference is made to the physiological standard required by the Pharmacopœia.

The mechanical make-up of the book is good and on the whole its contents entitle it to a prominent place in our list of pharmaceutical textbooks.

ROBERT P. FISCHELIS.

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## THE PHILADELPHIA COLLEGE OF PHARMACY.

### NINETY-SIXTH ANNUAL COMMENCEMENT.

The Commencement exercises of the Philadelphia College of Pharmacy extended from June second to June sixth. The baccalaureate services were held at the Church of St. Luke and Epiphany on Sunday, June 4, the baccalaureate preacher being Rev. Dr. David M. Steele. The sermon was based upon the text "How much is a man better than a sheep." The annual meeting of the Alumni Association was held on Monday afternoon. The Professors' Supper to the graduating classes was given in the Museum on Monday evening. Class Day exercises were held on Tuesday afternoon, June 5. The annual reunion of the Alumni Association was in the nature of a special entertainment followed by a dance. Owing to illness Dean Joseph P. Remington was unable to attend the exercises connected with Commencement and it is the ardent hope of the faculty, students and members of the College that he will soon return to the halls of the College.

The Commencement exercises were held on Wednesday evening,

June 6, at the American Academy of Music, when the diplomas and prizes were awarded to the members of the graduating classes and honorary degrees were conferred. The opening prayer was made by Rev. Frederick L. Sigmund, and an address was delivered by Mr. Edward J. Cattell. The degrees were conferred by President Howard B. French.

The following are the names of those receiving the degree of Master in Pharmacy (Ph.M.) *honoris causa:* Julius William Sturmer, Phar.D., William Baker Day, Ph.G., Frederick John Wulling, Ph.G., LL.D., John Karl Thum, Ph.G.

The degree of Master in Pharmacy (Ph.M.) *in course* was awarded Charles Elbert Hoffman, P.D., of the class of 1909 P.C.P.

The degree of Bachelor in Chemistry and Pharmacy (B.Sc.) was awarded for the first time upon Louis Gershenfeld, P.D., of the class of 1915 P.C.P.

The following are the names of those receiving the degree of Doctor in Pharmacy (P.D.) together with the subjects of their graduating theses:

| Name | Thesis | |
|---|---|---|
| Adams, Ernest Watts | Application of Purity Tests | New Jersey |
| Adler, Rudolph Wolf | Chaulmoogra Oil | Pennsylvania |
| Banzhof, Harry George | Olive Oil | Pennsylvania |
| Beers, James Norman | Cold Creams | Pennsylvania |
| Boehme, Lawrence Karl | Cod Liver Extracts | Ohio |
| Bradburd, Harry Aaron | Industry of Chamois Skins | Pennsylvania |
| Brenner, Harry Ellsworth | Rheum | Pennsylvania |
| Brown, Barton Gerald | Gossypium Purification | New York |
| Brown, Leland Nelson | Cannabis, Its Cultivation | Delaware |
| Bucke, Samuel Lawrence | Elixir of Pepsin and Bismuth, N. F. | Pennsylvania |
| Calkins, Arthur Robert | Spiritus Ammon. Aromaticus | Pennsylvania |
| Carroll, Paul Raymond | | Pennsylvania |
| Clapham, Miss Amanda Elizabeth | | Pennsylvania |
| Colestock, Chauncey Parven | Three Modified N. F. Preparations | Pennsylvania |
| Cossoy, Herman Lincoln | The Vanilla Bean | Pennsylvania |
| Craft, Charles Clagett | Urine Analysis | Dist. of Col. |
| Cravens, John Coldsmith, Jr. (P.C.) | Castor-Jell | Pennsylvania |
| Croff, Adam Cleveland | Solution of Peptonate of Iron N. F. | Missouri |
| Davidson, Abraham (Ph.G.) | Sulphur, Its Properties and Uses | New York |
| Dinklocker, Robert George | Sponges | Pennsylvania |
| Dohner, Harold Bertram | Santonica | Pennsylvania |
| Duster, Elmer Joseph | Microscopy of Morbid Urine | Pennsylvania |
| Ehman, Karl Francis (P.C.) | Glycyrrhizin | Pennsylvania |
| Ellis, Chester Alexander | Petrolatum Liquidum | Pennsylvania |
| Ellis, Wilbur James | Insect Powder | Tennessee |

| | | |
|---|---|---|
| Ernest, Harold Langsdorf | Anesthetics | Pennsylvania |
| Evanson, Axel Alfred (Ph.G.) | Tests on Two Types of Chemical Disinfectants | North Dakota |
| Farrell, Robert Joseph | Characteristics of Urine | Pennsylvania |
| Fenstermacher, Clarence Hoover | Process for Extracting Gold by Potassium Cyanide | Pennsylvania |
| Foran, Ralph Richard | Superfluous Drugs | Pennsylvania |
| Forbes, William Clifford | The Sterilization of Hair and Shaving Brushes | Alabama |
| Frick, Charles Keyser | Fluorescence of Cathartic Drugs. | Pennsylvania |
| Fuhr, Harry Godshall | Potassium Permanganate | Pennsylvania |
| Garrell, Frank Emanuel | The A. Ph. A. Recipe Book with Formulas for Toilet Creams. | Pennsylvania |
| Gold, Martin Hollenbach | The Diatomaceæ and Other Organisms in the Philadelphia Water Supply | Pennsylvania |
| Grandy, Seth Parker (P.C.) | Influenza | Pennsylvania |
| Gross, George Richard | Disinfectant Value of Liquor Formaldehydi | Pennsylvania |
| Grove, Arthur Landis | The Manufacture of Intestinal Antiseptic Tablets | Pennsylvania |
| Hallman, Albert Jefferson | The Dangers Hidden in a Home Medicine Chest | Pennsylvania |
| Harrison, Thomas West Danville | Salvia | Pennsylvania |
| Harrison, Joseph Whipple Eugene | The Manufacture of Alkaloids by Lloyd's Reagent | New York |
| Hawbaker, Omar | Coriaria Myrtifolia | Pennsylvania |
| Hertzler, Norman Brubaker | Liniments, Involving Saponification | Pennsylvania |
| Hocker, Alvin Roy | The Microscopical Structure of Hyoscyamus Niger | Pennsylvania |
| Holloway, John Wilson (P.C.) | Greaseless Vanishing Creams | Pennsylvania |
| Huber, Hiram Franklin | Stock Preparation Costs | Pennsylvania |
| Huth, Harry Godfrey | Pharmaceutical Agitation | Wisconsin |
| Ibberson, Fred Earl | Calamine | Pennsylvania |
| Jones, Herbert Sight | Red Cabbage as an Indicator | Pennsylvania |
| Jordan, Herbert Victor (P.C.) | Sugar | Pennsylvania |
| Kane, Bernard | Phenol | Pennsylvania |
| Kapler, Amos William | The Tanning of Leather | Pennsylvania |
| Kelchner, Lawrence Samuel | Commercial Glucose | Pennsylvania |
| King, Jacob Harris (P.C.) | Filter Paper | Pennsylvania |
| Koch, Chauncey Astor | The Geological Formation of Sulphur and the Advancement in the Industry | Pennsylvania |
| Krauss, Edward | Japanese Aconite | Pennsylvania |
| Laucks, Frederick Scholl | Comparative Methods for the Assaying of Ipecac | Pennsylvania |
| Leibowitz, Jacob Louis | The Quantitative Separation of Strychnine and Brucine | Pennsylvania |
| Ligan, Robert Franklin (P.C.) | The Steel Industry | Pennsylvania |
| Lowther, Frederick Samuel | Salicylic Acid | Pennsylvania |
| McCann, Thomas Joseph | Soda Mint and Pepsin Tablets. | Pennsylvania |
| McClure, Edward Everett Powell | The Determination of Phosphoric Acid | Pennsylvania |

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|---|---|---|
| McKeel, Charles Baynor | Products of Southern Pine | No. Carolina |
| Maier, Albert Thomas | Hydrogen Dioxide | New Jersey |
| Maust, Jonas Gilbert | Glycerole Hypophosphites Compound | Pennsylvania |
| Milner, Louis | Physiological Testing of Enteric Coating | Pennsylvania |
| Murray, Lindley Rhea | The Determination of Borax in Borax Soaps | Pennsylvania |
| Nace, Earl Gray | Toilet Waters | Pennsylvania |
| Nagle, Philip Eugene | Liquor Magnesii Citratis | Pennsylvania |
| Nelson, Carl Harold | Black Antimony | Pennsylvania |
| Newcomer, Leo L. | Colloidal Suspensions | Pennsylvania |
| Null, Harry Watson | The Commercialization of Oxygen | Pennsylvania |
| Parvin, Edwin Cyrus | Liquor Magnesii Citratis | New Jersey |
| Pittman, Gerald Sutvan | Face Powders | Pennsylvania |
| Powell, James Clayton | Alkali Lands | Pennsylvania |
| Pryor, Charles Taylor | The History of the Volatile Oils. | Pennsylvania |
| Rex, Walter William | Logwood | Pennsylvania |
| Rodes, Harry Beard | Glycerite of Hydriodic Acid | Pennsylvania |
| Rosenfeld, Lawrence Marx | Cupri Sulphas | Pennsylvania |
| Rupp, Robert Adam | Moulds | Pennsylvania |
| Rupp, Walding George | Triticum | Ohio |
| Schoenthaler, Russell John | Acidum Hypophosphorosum | New Jersey |
| Shinn, Edward | Cultivation of Medicinal Plants. | Illinois |
| Shoop, James Harper | The Drugs Affecting the Urine and Urinary Apparatus | Pennsylvania |
| Siegfried, Charles Francis | Tincture of Nux Vomica | Pennsylvania |
| Skeath, Alexander Hamilton Butler | Acetic Acid | Pennsylvania |
| Snyder, William Henry (P.C.) | Production of Industrial Alcohol | Pennsylvania |
| Sutton, William Henry, Jr. | The Chemistry of Low-Freezing Brines | New Jersey |
| Thomas, John Carter | Home Manufacture and Uses of Unfermented Grape Juice. | Delaware |
| Wagner, Raymond Charles Bernard | The Manufacture and Uses of Serums, Bacterins and Vaccines | Pennsylvania |
| Webster, Leslie Sharpless | Saturated Solution Boric Acid. | Pennsylvania |
| Wishnefsky, Harry | Caffeine, Theobromine and Theophylline | New Jersey |
| Zercher, Charles Stanley | Aromatic Waters | Pennsylvania |
| Ziegler, Paul Fleager | Commercial Cleaning Fluids | Pennsylvania |

The following graduates were awarded the degree of Pharmaceutical Chemist (Ph.C.):

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|---|---|
| Angstadt, Harry Franklin | Pennsylvania |
| Brosius, George N. | Pennsylvania |
| Buchman, Evan | Pennsylvania |
| Frederick, Charles R. | Pennsylvania |
| Heine, Edward | Pennsylvania |
| Jones, Chester Kimmerer | Pennsylvania |
| Persing, William E. | Pennsylvania |
| Woehrle, Paul Philip | Pennsylvania |
| | Pennsylvania |

To the following graduates the degree of Pharmaceutical Chemist (P.C.) was awarded together with the subjects of the theses submitted:

| Name | Thesis | |
|---|---|---|
| Brown, Paul Revere | The Value of Pharmacognosy to the Retail Pharmacist | Pennsylvania |
| Costello, Miss Genevieve Marie | Vanilla | Pennsylvania |
| Devitt, John | Digitalis | Pennsylvania |
| Duron, Guillermo Enrique | Capsicum | Pennsylvania |
| Heckman, Paul Willard | Some of the Lotions Suggested for the Recipe Book of the American Pharmaceutical Association | Pennsylvania |
| McNelis, Miss Anna Camillus | Ampoules | Pennsylvania |
| Mulford, Henry Kendall, Jr. | The Deterioration of Digitalis | Pennsylvania |
| Richman, Samuel Thompson | The Histology of Two Spurious Cubebs | New Jersey |
| Sister Mary Beatrice | Pilocarpus | Pennsylvania |
| Sister Mary de Chantal | Incompatibility | Pennsylvania |
| Smith, Donald Benner | Hair Dyes and Color Restorers | Pennsylvania |
| Steinsnyder, Barnett | Benzinum Purificatum | New York |
| Stickle, Morton Donaldson | Sterilization of Camphorated Oil | Honduras |
| Tyson, Jacob Homer | Nature's Methods of Seed Dissemination | Pennsylvania |
| Way, Miss Helen | Organotherapy | New Jersey |

The degree of Graduate in Pharmacy (Ph.G.) was awarded the following graduates:

| Name | Thesis | |
|---|---|---|
| *Abalo, Aristides | | Cuba |
| *Adams, Elwood C. | | Pennsylvania |
| *Ahrendts, Conrad Henry | | Pennsylvania |
| Anderson, James Philip | Spiritus Aetheris Nitrosi | Ohio |
| *Ashcraft, Bernard Alfred | | Pennsylvania |
| Bambrick, Martin Joseph | Petrolatum | Pennsylvania |
| Baron, Samuel | Theobroma Cacao | Pennsylvania |
| *Beckett, Thomas Aloysius | | Pennsylvania |
| Bienstock, Nathan Samuel | Retail Pharmacy Advertising | Connecticut |
| Bohn, Frederick Henry | Soda Foam Producers | New Jersey |
| Bowman, Walter Jennings | Pill Excipients | Pennsylvania |
| Bowron, Dilley Arthur | Sterilization | Ohio |
| Brodman, Mrs. Bessie Liss | Hydrogen Dioxide in Mixtures | Pennsylvania |
| Buckwalter, Clarence Clifton | Stramonium Leaves | Pennsylvania |
| Burbage, George Andrew | Sterilization | Maryland |
| Carter, William Baker | Veterinary Preparations | Pennsylvania |
| Carter, William James | Nux Vomica | Pennsylvania |
| Clarke, Ray Shearer | Commercial Colloidal Silver | Pennsylvania |
| Cole, Charles Woodson | Assaying of Magma Magnesia | Pennsylvania |
| Cooperman, Daniel | Merchandising | Maryland |
| Cribbs, Frank Albert | Preservation of Volatile Oils | Pennsylvania |
| *DeBlasio, James John | | Pennsylvania |
| Devers, Miss Margaret | Maize Oil | Pennsylvania |
| *Dunston, William Harold | | Pennsylvania |

* Thesis not required.

| | | |
|---|---|---|
| Evans, Hunter Leon | Tincture of Strophanthus | Pennsylvania |
| *Folk, Howard George | | Pennsylvania |
| Foust, Clarence Herr | Glycyrrhiza | Pennsylvania |
| Frazer, Donald Morrow | Prescription Dispensing—Powders | Ohio |
| Fundora, Florentino Lope | Tincture of Iodine | Cuba |
| Gardner, Stanley Preston | The Arsenic Test of the U. S. P. | Pennsylvania |
| *Garr, Hyman David | | Pennsylvania |
| Gehman, Walter Warren | Decolorized Tincture of Iodine. | Pennsylvania |
| Gershenfeld, Joseph Charles. | Cocoanut Oil | Pennsylvania |
| Griesing, Howard William | Ambrine | Pennsylvania |
| *Hacker, Raymond Colby | | Ohio |
| *Hafer, LeRoy Irvin | | Pennsylvania |
| Haldeman, Glenn Arthur | Intestinal Antiseptics and Disinfectants | Ohio |
| *Hall, Edward Willard | | Pennsylvania |
| Hamilton, David Ambrose, Jr. | Honey and Its Uses in Pharmacy | Pennsylvania |
| Hammill, Arthur Vincent Francis | Drug Store Advertising | Pennsylvania |
| Heath, Raymond George | Commercial Papain | Pennsylvania |
| Helnore, John Charles | New Mercurial Preparations | Wisconsin |
| *Hernandez, Antonio Alejandro—Mena | Kaolin, Relation to Diphtheria Bacillus Growth | Cuba |
| Imler, Richard Monroe | Liquid Petroxolin | Pennsylvania |
| Karn, John William | Ampoules | Wisconsin |
| *Kelley, John Forrest | | Pennsylvania |
| Knoepfel, Harry John | Kieselguhr | Pennsylvania |
| Krechmer, Max Ellis | New Kinds of Syphons | New Jersey |
| Langeluttig, Joseph Ellis | | Pennsylvania |
| McCarney, Merle | Assay of Lime Water | Pennsylvania |
| *Macias, Francisco P. | | Cuba |
| Meagher, Matthew Clarence. | Antiseptic Dental Cream | Pennsylvania |
| *Medvedkin, Jacob Louis | | Pennsylvania |
| Meyers, Louis Fred | Suppositories | Pennsylvania |
| Milburn, Arland Roland | Sugar Cane and By-products | Delaware |
| Miller, Robert William | Acidum Nitrohydrochloricum Dilutum | Pennsylvania |
| Mills, John Herman, M.D. | Castela Nichelsoni, var. texana. | Florida |
| *Morgan, Thomas Asaph | | Pennsylvania |
| Moyer, Raymond John | Chemical History | Pennsylvania |
| *Moylan, Joseph Aloysius | | Pennsylvania |
| *Mulherin, James Patrick | | Pennsylvania |
| *Neff, Aaron | | Pennsylvania |
| Nicholl, Elmer Thomas | Window and Show Case Decorating | Pennsylvania |
| Nichols, Adley Bonisteel | Terra Silicea Purificata | Wisconsin |
| *Potts, Earl Luther | | Pennsylvania |
| Powell, Miss Edythe Bird | Hydrogen Peroxide in Milk | Pennsylvania |
| *Ramirez, Jose—Flores | | Cuba |
| *Reynes, Jose Santiago | | Cuba |
| Rinn, Miss Hazel Marie | Suppository Making | Pennsylvania |
| Rishton, Myron Parker | Plantago Rugelii | Pennsylvania |
| Rodis, Louis | Facts Regarding the Pennsylvania Pharmacy Laws and the Harrison Narcotic Law | New Jersey |
| *Ruff, Ulysses Gilbert, Jr. | | Pennsylvania |
| *Schneck, William Owen | | Pennsylvania |
| Schultz, Miss Anna L. | Tooth Washes | Pennsylvania |

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|---|---|---|
| Seltzer, Robert Hood | Window Dressing | Pennsylvania |
| Shaak, John Franklin | Cotton Seed Oil | New Jersey |
| *Shaw, John Donald | | New Jersey |
| Shaw, Neal Wendle | Ethyl Chloride as a General and Local Anesthetic | Ohio |
| Sherman, Alexander | Medicinal and Other Soaps | Pennsylvania |
| *Shiley, Harry Allen | | Pennsylvania |
| *Skloff, Myer | | Russia |
| Smith, Miss Rose Frances | Pharmacognosy of Green Ginger and the Superiority of Preparations of the Fresh Drug | Pennsylvania |
| Steidle, Carl Frederick | Potassium Bromide | Pennsylvania |
| Steigrod, Harry Archie | Lime Water | Pennsylvania |
| Sunday, Jesse Hartzell | Solution Peptonate of Iron and Manganese | Pennsylvania |
| *Tesman, Jacob | | Pennsylvania |
| Thomas, Miss Bessie Estella | Dakin-Carrel Solution and Ambrine | Pennsylvania<br>Pennsylvania |
| Tuck, Henry Cornelius | Peppermint | Pennsylvania |
| Usher, William Francis | Iodine and Official Preparations. | Pennsylvania |
| Wagner, Clarence Kinney | Zinc, Metallic and Oxide | Pennsylvania |
| Warricks, James Robert | Synthetic Oil of Bitter Almonds. | Pennsylvania |
| *White, Ray Ellsworth | | Pennsylvania |
| Young, Joseph Roy | Bacteriology in Pharmacy | Pennsylvania |

The following students who have passed all Second Year Examinations and are eligible for the Degree of Ph.G. when the other graduation requirements shall have been met received a Certificate attesting to these facts.

| Name | Thesis | |
|---|---|---|
| Barab, Harry | The Composition of Certain Face Powders | Pennsylvania |
| Bass, Albert Abe | Physiological Standardization of Digitalis | Pennsylvania |
| *Blumberg, Maurice | | New Jersey |
| *Braker, Norman Clifton | | Pennsylvania |
| *Braslavsky, Albert | | Pennsylvania |
| Carroll, John Francis | Cork, Its Origin and Uses | Pennsylvania |
| Cotanch, James Gilbert | The Tryptic and Peptic Power of Elixir of Lactopeptine and Elixir of Digestive Compound | New York |
| Dabney, Maurice Benjamin | Vaccines, Serums and Other Bilogical Products | Pennsylvania |
| Di Silvestro, Miss Elisa | Vitamines | Italy |
| Dompf, Solomon Harry | Pepsin and Its Preparations | Russia |
| Dudley, Leonard Freeman | The Tinctures of the Eighth and Ninth Revisions of the U. S. P. | New Hamp're |
| Dunmire, Wilbert Jacob | Cost of the Tinctures of the N. F. | Pennsylvania |
| Edgar, Roy Alfred | Cream of Camphor | Pennsylvania |
| *Ettelman, Abraham Guedalyah | | Pennsylvania |

* Thesis not required.

| | | |
|---|---|---|
| Fox, Miss Bessie Carrie Belle. | Albuminates and Peptonates ... | Connecticut |
| *Friedman, Charles Jonas .... | ..... | Pennsylvania |
| *Gehman, Matthew Stanley .. | ..... | Pennsylvania |
| *Herman, Abraham Lincoln .. | ..... | Pennsylvania |
| Hess, Claude Thomas ..... | Buttermilk ..... | Pennsylvania |
| Hidlay, William Clair ..... | Deodorized Oleic Acid ..... | Pennsylvania |
| *Hoffstein, Benjamin Herman. | ..... | Pennsylvania |
| *Hotchkiss, Harry Edward .. | ..... | New York |
| *Hovsepian, Haig S. ..... | ..... | Armenia |
| Hysore, Charles Alphenas .. | Fat Free Galenicals ..... | Pennsylvania |
| Jackson, Clifford Payne .... | The Modification of Milk for Infants ..... | Pennsylvania |
| *Klingaman, Claude Raymond. | ..... | Pennsylvania |
| Lehrfeld, Manuel ..... | Magnesium and Its Compounds. | Pennsylvania |
| Lippincott, Melcour Restore. | The Purification of Fatty Oils.. | New Jersey |
| Mackler, Miss Rose ..... | Magnesium Sulphate ..... | New Jersey |
| *Miller, Earl Thomas ..... | ..... | Pennsylvania |
| Schwartz, Harry Leet ..... | Effervescing Salts ..... | Pennsylvania |
| *Snyder, Charles Asemowitz.. | ..... | Pennsylvania |
| Stapleton, Richard Michael.. | Coal and Its Marketing ..... | Pennsylvania |
| Stoneback, William Jennings. | Balsam Apple ..... | New Jersey |
| Thorne, Miss Elizabeth Kathryne ..... | Wild Beach Plums ..... | New Jersey |
| Unterberger, Louis ..... | Manufacture of Paper ..... | Pennsylvania |
| Weir, William Partee ..... | Talc ..... | Virginia |
| Wepfer, Emil Albert ..... | Trifolium Pratense ..... | Wisconsin |

Certificates of Proficiency in Chemistry were awarded the following graduates:

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|---|---|
| Coble, Charles L. ..... | Pennsylvania |
| Sands, Paul D., P.D. ..... | Pennsylvania |

Certificates of Proficiency in the Food and Drug Course were awarded the following graduates:

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|---|---|
| Harvey, Gilbert Leon ..... | Pennsylvania |
| Ottinger, Harry Philip ..... | Virginia |

Certificates in Bacteriology were awarded the following:

| Name | Where From |
|---|---|
| Carbo, Pedro ..... | Cuba |
| Coble, Charles L. ..... | Pennsylvania |
| Day, John Frederick ..... | Pennsylvania |
| Dickhart, Wallace H. ..... | Pennsylvania |
| Flores, David ..... | Cent. Amer. |
| Forbes, William Clifford ..... | Alabama |
| Gross, George Richard ..... | Pennsylvania |
| Henderson, Clarence Harry ..... | California |
| Henning, Edward F., P.D. ..... | Pennsylvania |
| Hernandez, Antonio—Mena ..... | Cuba |
| Horton, James Stanislaus ..... | Pennsylvania |
| Marxuach, Acisclo ..... | Porto Rico |
| Menkemeller, William, Jr. ..... | W. Virginia |
| Mulford, Henry Kendall, Jr. ..... | Pennsylvania |
| Neiffer, Grover Wellington ..... | Pennsylvania |

* Thesis not required.

| | |
|---|---|
| Norton, Charles | Pennsylvania |
| Ramirez, Hermogenes C. | Cuba |
| Reynes, Jose S. | Cuba |
| Rutter, Lee Deitrich, P.D. | Pennsylvania |
| Shaffer, James Walter, P.D. | Pennsylvania |
| Smith, Russell C. | Pennsylvania |
| Smith, Donald B. | Pennsylvania |
| Sorber, Benjamin A. | Pennsylvania |
| Stickle, Morton D. | New Jersey |
| Stoppel, Albert | Minnesota |

## Award of Prizes.

### *Doctor in Pharmacy (P.D.) Course.*

The grade of distinguished was attained by Miss Amanda E. Clapham. The following graduates received the grade of meritorious: Lawrence Karl Boehme, Axel Alfred Evanson, Ph.G., Helen Way and Harry Wishnefsky.

The Materia Medica Prize, $25, offered by Prof. Clement B. Lowe, for the best examination in Materia Medica, and in recognition of Materia Medica Specimens with a meritorious thesis, was awarded to Amanda E. Clapham, the following students receiving honorable mention in connection therewith: Abraham Davidson, Martin H. Gold, Walding G. Rupp and Helen Way.

The Microscopical Research Prize, a compound microscope, offered by Prof. Henry Kraemer for the most meritorious thesis involving original Microscopic work, was awarded to Martin H. Gold, the following receiving honorable mention: Leland N. Brown, Paul R. Brown, John Devitt, Guillermo E. Duron, Walter J. Ellis, Charles K. Frick, Thomas W. D. Harrison, Omar Hawbaker, Alvin R. Hocker, Edward Krauss, Samuel T. Richman, Walding G. Rupp, Edward Shinn and Sister Mary Beatrice.

The Dispensing Prize, $20 in gold, offered by Prof. E. Fullerton Cook for the best examination in Operative Pharmacy and Dispensing, was awarded to Earl G. Nace, the following students receiving honorable mention: Ernest W. Adams, Adam C. Croff, Frank E. Garrell, Russell J. Schoenthaler, Charles F. Siegfried, Donald B. Smith and William H. Sutton, Jr.

The Maisch Botany Prize of $20 in gold, offered by Mr. Joseph Jacobs, of Atlanta, Ga., for Histological Knowledge of Drugs, was awarded to Martin Hollenbach Gold, the presentation being made by Mr. George M. Beringer, Alvin R. Hocker receiving honorable mention.

The J. B. Moore Memorial Prize, a Troemner Agate Prescrip-

tion Balance, offered by the Reverend J. J. Joyce Moore in memory of his father, J. B. Moore, to the member of the third year graduating class presenting the best thesis representing original work in the Department of Pharmacy, was awarded to Rudolph W. Adler, the presentation being made by Prof. LaWall.

The Commercial Pharmacy Prize, $20 in gold, offered by Prof. Joseph P. Remington to the graduate who passed the best examination in Commercial Pharmacy at the final examination for the degree, was awarded to Herbert S. Jones, the presentation being made by Dr. Adolph W. Miller, the following receiving honorable mention: Ernest W. Adams, Rudolph W. Adler, Lawrence K. Boehme, Paul R. Carroll, Amanda E. Clapham and Edwin C. Parvin.

The Instructors' Prize, $20, offered by the Instructors of the College for the highest term average in the branches of Pharmacy, Chemistry and Materia Medica, was awarded to Amanda E. Clapham, the presentation being made by Prof. Stroup, the following receiving honorable mention: Rudolph W. Adler, Lawrence K. Boehme, Paul R. Carroll and Charles F. Siegfried.

The Pharmacy Review Prize, one year's membership in the American Pharmaceutical Association, offered by Prof. Charles H. LaWall for the best term work in Theory and Practice of Pharmacy, was awarded to Walding G. Rupp, the following receiving honorable mention: Lawrence K. Boehme, Ralph R. Foran and Harry Wishnefsky.

The Kappa Psi Fraternity Prize, a gold medal, offered by the Eta Chapter of the Kappa Psi Fraternity to the graduate making the highest general average during the three years' course at the College, was awarded to Lawrence K. Boehme, the presentation being made by Mr. Harry K. Mulford, the following receiving honorable mention: Amanda E. Clapham, Ralph R. Foran, Herbert L. Jones, Helen Way and Harry Wishnefsky.

### *Graduates in Pharmacy (Ph.G.) Course.*

The grade of distinguished was attained by Matthew C. Meagher, and the following graduates merited the grade of meritorious: William J. Carter, Margaret Devers, Donald M. Frazer, Howard W. Griesing, John H. Mills and Rose F. Smith.

The William B. Webb Memorial Prize, a gold medal and certificate, offered for the highest general average in the branches of Committee, Operative Pharmacy and Specimens, was awarded to William P. Weir, the presentation being made by Mr. Warren H.

Poley, the following receiving honorable mention in connection therewith: Frederick H. Bohn and Charles A. Hysore.

The Microscopical Research Prize, a compound microscope, offered by Prof. Henry Kraemer for the most meritorious thesis involving original microscopic work, was awarded to Rose Frances Smith, the following graduates receiving honorable mention: John H. Mills, William J. Stoneback, Elizabeth K. Thorne and Emil A. Wepfer.

The Operative Pharmacy Prize, $20 in gold, offered by Prof. Joseph P. Remington for the best examination in Operative Pharmacy, was awarded to James G. Cotanch, the presentation being made by Prof. Samuel P. Sadtler, the following students receiving honorable mention: Harry Barab, Claude R. Klingaman, Melcour R. Lippincott, George McCrea Miller, Neal W. Shaw and Harold F. Staub.

The Mahlon N. Kline Theoretical Pharmacy Prize, a Troemner Agate Prescription Balance, for the best examination in Theory and Practice of Pharmacy, was awarded to Rose Frances Smith, the presentation being made by Mr. Joseph W. England, the following students receiving honorable mention: Donald M. Frazer, Elmer T. Nicholl and Edythe B. Powell.

The Commercial Pharmacy Prize, $20 in gold, offered by Prof. Joseph P. Remington to the graduate who passed the best examination in Commercial Pharmacy at the final examination for the degree, was awarded to John H. Mills, the presentation being made by Dr. Robert P. Fischelis, the following students receiving honorable mention: Nathan S. Bienstock, William J. Carter, Donald M. Frazer, Howard W. Griesing and Charles Hysore.

The Instructors' Prize, $20, offered by the Instructors of the College for the highest term average in the branches of Pharmacy, Chemistry and Materia Medica, was awarded to Merle McCarney, the presentation being made by Dr. Alfred Heineberg, the following students receiving honorable mention: William J. Carter, Howard W. Griesing and Matthew C. Meagher.

The Pharmacy Review Prize, one year's membership in the American Pharmaceutical Association, offered by Prof. Charles H. LaWall for the best term work in Theory and Practice of Pharmacy, was awarded to Howard W. Griesing, the presentation being made by Dr. Charles E. Vanderkleed, the following receiving honorable mention: Margaret Devers, Elisa di Silvestro, Hyman D. Garr and Merle McCarney.

## OBITUARY.

### Julius Otto Schlotterbeck.[1]

Julius Otto Schlotterbeck was born in Ann Arbor in 1865. After attending graded and high schools in that city, he entered the University of Michigan, from which he was graduated with the degree of Ph.C. in 1887. One year later he was made assistant instructor in pharmacognosy and pharmacy in the university. In 1891 he was made assistant instructor in pharmacy and was granted a B.S. degree. From 1893 to 1895, he filled this position, after which he spent two years in the University of Berne, Switzerland, graduating *summa cum laude* in 1897 with the degree of doctor of philosophy.

He returned to the University of Michigan immediately after, accepting the position of assistant professor of pharmacognosy and pharmacy, which he held until 1904, when he was made professor of these studies. In 1905 he was appointed dean of the college of pharmacy by the board of regents.

Dr. Schlotterbeck created an enviable reputation as a scientist by discovering several vegetable alkaloids. For nearly twenty-five years he was associated with Frederick Stearns & Company as consulting expert and he had been a member of the firm of the J. Hungerford Smith Company. He was a member of the committee of revision of the United States Pharmacopœia, a (fellow) member of the American Association for the Advancement of Science, a member of the American Pharmaceutical Association, former secretary and president of the Conference of Pharmaceutical Faculties, a member of the American Chemical Society, was prominently associated with the Detroit branch of the American Pharmaceutical Association and former president of the Michigan State Pharmaceutical Association. He was a frequent and valued contributor to leading scientific journals and had published many important papers, possibly a majority on phyto-chemistry.

Dean Schlotterbeck is survived by the widow, Mrs. Eda C. Schlotterbeck, and three children; Prescott, nineteen, a freshman in the literary college of the University of Michigan; Miriam, sixteen, a high school student, and Carl, seven.

[1] A tribute to the memory of Dr. Schlotterbeck by Frederick Stearns & Company, with whom he was associated as consulting expert chemist for a quarter of a century.

Funeral services were held from the late residence, at 1907 Washtenaw avenue, Ann Arbor, Sunday, June 3. Interment was in Forest Hill Cemetery, Ann Arbor.

Just at the noontide of his life, when his brilliant pharmaceutical ability had become universally recognized, with well-earned honors accumulating more and more rapidly, his children budding into young manhood and womanhood and his host of friends ever widening and becoming more endeared to him, Dr. Schlotterbeck was summoned to the Final Analysis.

In the crucible of life must be compounded both joy and sorrow, love and loss. So all must feel who knew him.

To associate with Dr. Schlotterbeck was always a pleasure and a gain. His friends of classroom, post college days, scientific societies and among the pharmaceutical manufacturers considered it ever a pleasure to cultivate his society and learn from the precepts emanating from his masterly mind.

His departure left a sense of vacancy, realization that an exceptional teacher, a profound scientist and an admirable man had left an empty chair.

Probably no characteristic of this man—called after five months of almost continued suffering, from laboratory and friend and hearth and classroom to that land from whose bourne no traveler returns—stood out in more bold relief than loyalty.

And not only was he loyal in every deed and thought, but he engendered the spirit of this quality in all with whom he came in close contact.

The faculty and students of the University of Michigan ever took pride in asserting their staunch loyalty to this man of science and thousands will always be loyal to his memory as they meditate on the rude stroke of the reaper, which cutting down this virile life at its zenith also struck heart blows felt from farm to teeming metropolis, from desert span to ocean waste.

Dr. Schlotterbeck was a home man—the passion of science never built a barrier between him and his fireside.

Platitude and epigram anent the passing of the loved and lost from the fertile valley of life, beyond the barren great divide of eternity, find no place in a memoriam to Dr. Schlotterbeck; his loss calls from every member of his great family of students, coworkers and friends a spontaneous tribute. And that tribute in tears, in words, and in thought, is paid by all those who knew him well.

It is as if the Master Pharmacist had emptied a vial of sorrow into the graduate of their lives.

Dr. Schlotterbeck possessed faith and vision—the work which he accomplished will live long years after dust has returned to dust.

Ability, loyalty, faith and vision, these were the outstanding traits of his character. These he defined in his daily work, he lived them and inspired others to live them. Through his loyalty, vision and ability he made better men and women and better pharmacists by his faith in man and in pharmacy.

The work of Dr. Schlotterbeck is bequeathed as a rich heritage to those wherever they may be, who have worked with him and learned to know and therefore to admire him.

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## PHARMACEUTICAL MILITARY ASSOCIATION ORGANIZED.

The first step in what promises to be the most active campaign yet undertaken for obtaining recognition for pharmacists in the Army and other branches of the government service was taken at a meeting of the allied pharmaceutical bodies of Philadelphia held at the Philadelphia College of Pharmacy, Monday evening, June 26th, 1917. A permanent organization was formed with Mr. George M. Beringer president, and Robert P. Fischelis secretary-treasurer. The Association will be known as the Pharmaceutical Military Association. An Executive Committee consisting of the following members of the various associations represented was appointed by the president: J. W. England and Walter B. Smith of the Philadelphia Drug Exchange; Ambrose Hunsberger and Eugene G. Eberle of the Philadelphia Branch of the American Pharmaceutical Association; Samuel C. Henry and J. C. Peacock of the Philadelphia Association of Retail Druggists, Henry Kraemer and Robert P. Fischelis of the Philadelphia College of Pharmacy; Dr. W. D. Robinson and Mr. George M. Beringer, ex officio. This committee is to cooperate with the Committee on War Defense of the Pennsylvania Pharmaceutical Association, consisting of Dr. F. E. Stewart, chairman, Professor J. A. Koch, Louis Frank, J. W. England and John K. Thum. Future meetings of the association will be held at regular intervals and immediate steps will be taken to get in touch with the proper government authorities to further the objects of the association.